RULE 4604 -- CAN AND COIL COATING OPERATIONS

(Adopted April 11, 1991; Amended September 19, 1991; Amended May 21, 1992; Amended December 17, 1992; Amended December 20, 2001)

1.0 Purpose

The purpose of this rule is to limit the emissions of volatile organic compounds (VOCs) from can and coil coating operations, and from the organic solvent cleaning, and the storage and disposal of solvents and waste solvent materials associated with such coating operations. This rule also provides the administrative requirements for recording and measuring the emissions.

2.0 Applicability

This rule applies to can and coil coating operations, to the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials associated with such coating operations.

3.0 Definitions

3.1 Aerosol Product: a hand-held, non-refillable container that expels a pressurized solvent-containing product by means of a propellant-induced force.

3.2 Application Equipment: a device, including, but not limited to, a spray gun, brush, and roller, used to apply adhesives, coatings, or inks.

3.3 Can and Coil Coating: any coating containing organic materials and applied by spray, roller or other means to the inside and/or outside surfaces of metal cans, drums, pails, or lids, or to the surface of flat metal sheets, strips, rolls, or coils for further industrial or commercial use.

3.4 Coating: a material applied onto or impregnated into a substrate for protective, decorative, or functional purposes. Such materials include, but are not limited to, paints, varnishes, sealers, and stains.

3.5 Coating Applicator: an apparatus used to apply a surface coating.

3.6 Coating line: an operation or process for applying, drying, or baking and/or curing surface coatings, together with associated equipment including, but not limited to, a coating applicator, flash-off area, and oven.

3.7 Coil: any flat metal sheet or strip that is rolled or wound in concentric rings.

3.8 Composite Partial Pressure: the sum of the partial pressures of the VOC compounds in a solvent. The VOC composite partial pressure is calculated as follows:

$$PPc = \frac{\sum_{i=1}^{n} \frac{(W_i)(VP_i)}{MW_i}}{\frac{W_w}{MW_w} + \sum_{e=1}^{k} \frac{W_e}{MW_e} + \sum_{i=1}^{n} \frac{W_i}{MW_i}}$$

Where:

W_i = Weight of the "i"th VOC compound, in grams

W_w = Weight of water, in grams

W_e = Weight of exempt compound, in grams

MW_i = Molecular weight of the "i"th VOC compound, in grams per gram-mole

MW_w = Molecular weight of water, in grams per gram-mole

MW_e = Molecular weight of the "e"th exempt compound, in grams per gram-mole

PP_c = VOC composite partial pressure at 20°C (68°F), in mm Hg

VP_i = Vapor pressure of the "i"th VOC compound at 20°C (68°F), in mm Hg

3.9 Cured Adhesive, Cured Coating, or Cured Ink: an adhesive, coating, or ink that is dry to the touch.

3.10 Daily Weighted Average: the average actual emissions, calculated from daily production records of the volume of each type of coating, the application rate of each coating, the solvent and solids content of each coating, and the control efficiency for each application and expressed as grams of VOC per liter of coating applied, less water and exempt compounds.

3.11 Degreaser: a tank, tray, drum or other container in which objects to be cleaned are exposed to a solvent or solvent vapor in order to remove contaminants. The objects to be cleaned include, but are not limited to, parts, products, tools, machinery, and equipment. An enclosed spray application equipment cleaning system is not a degreaser.

3.12 Dissolver: an organic solvent that is added to an adhesive, coating, or ink in order to melt or to liquefy solid particles.

3.13 End Sealing Compound: a compound which is coated onto can ends and which functions as a gasket when the end is assembled onto the can.

3.14 Exempt Compound: an organic compound not classified as a volatile organic compound (VOC), as listed in the definition of volatile organic compound in Rule 1020 (Definitions).

3.15 Exterior Base Coating: a coating applied to the exterior of a can to provide protection to the metal or to provide background for any lithographic or printing operation.

3.16 Grams of VOC per liter of Material: the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per liter of material} = \frac{Ws - Ww - Wec}{Vm}$$

Where:

Ws	=	Weight of volatile compounds, in grams
Ww	=	Weight of water, in grams
Wec	=	Weight of exempt compounds, in grams
Vm	=	Volume of material, in liters

3.17 Interior and/or Exterior End Coating: a coating applied to the interior and/or exterior end of a can to provide protection to the metal.

3.18 Interior Base Coating: a coating applied to the interior of a can to provide a protective lining between the product and the can.

3.19 Interior Body Spray: a coating sprayed on the interior of the can body to provide a protective film between the product and the can.

3.20 Liquid Leak: a visible solvent leak from a container at a rate of more than three drops per minute, or a visible liquid mist.

3.21 Maintenance Cleaning: the cleaning of tools, forms, molds, jigs, machinery, and equipment, and the cleaning of work areas where maintenance or manufacturing occurs.

3.22 Manufacturing Process: the process of making goods or articles by hand or by machine.

3.23 Non-Absorbent Container: a container made of non-porous material that does not allow the migration of solvents through it.

3.24 Non-Atomized Solvent Flow: a solvent in the form of a liquid stream without the introduction of any propellant.

3.25 Non-Leaking Container: a container without liquid leak.

3.26 Organic Solvent: the same as "Solvent."

3.27 Organic Solvent Cleaning: as defined in Rule 4663 (Organic Solvent Cleaning, Storage, and Disposal).

3.28 Over-varnish: a coating applied directly over a design coating to reduce the coefficient of friction, to provide gloss and to protect and finish against abrasion and corrosion.

3.29 Propellant: any gas, including air, in a pressure container for expelling the contents when the pressure is released.

3.30 Repair Cleaning: a solvent cleaning operation or activity carried out during a repair process.

3.31 Repair Process: the process of returning a damaged object or an object not operating properly to good condition.

3.32 Solvent: as defined in Rule 4663 (Organic Solvent Cleaning, Storage, and Disposal).

3.33 Solvent Flushing: the use of a solvent to remove uncured adhesives, uncured inks, uncured coatings, or contaminants from the internal surfaces and passages of equipment by flushing solvent, by a non-atomized solvent flow, through the equipment.

3.34 Stationary Source: as defined in Rule 2201 (New and Modified Stationary Source Review Rule).

3.35 Stripping: the use of solvent to remove material such as cured adhesives, cured inks, cured or dried paint, cured or dried paint residue or temporary protective coating.

3.36 Surface Preparation: the removal of contaminants from a surface prior to the application of coatings, inks, or adhesives or before proceeding to the next step of a manufacturing process.

3.37 Thinner: a solvent that is added to an adhesive, coating, or ink to make it more fluid.

3.38 Three-piece Can-seam Spray: a coating sprayed on the exterior and/or interior of a welded, cemented, or soldered seam to protect the exposed metal.

3.39 Viscosity Reducer: an organic solvent which is added to an adhesive, coating or ink to make it more fluid.

3.40 Volatile Organic Compound (VOC): defined in Rule 1020 (Definitions).

3.41 Waste Solvent Material: any solvent which may contain dirt, oil, metal particles, sludge, and/or waste products, or wiping material containing VOCs including, but not limited to, paper, cloth, sponge, rag, or cotton swab used in organic solvent cleaning.

3.42 Wipe Cleaning: a solvent cleaning activity performed by hand rubbing an absorbent material such as a rag, paper, sponge, brush, or cotton swab containing solvent.

4.0 Exemptions

4.1 The provisions of Section 5.1 through 5.4 of this rule shall not apply to stationary sources which use three (3) gallons per day or less of coatings.

4.2 The lubricants applied by the spray mister to the can end sealing compound application nozzle and the lubricants applied to the can body during the can body forming process shall be exempt from all the provisions of this rule.

4.3 For existing stationary sources, if an incineration device is added or modified for the sole purpose of complying with the requirements of this rule, such a device shall be exempt from the Best Available Control Technology and the Offset requirements of Rule 2201 (New and Modified Stationary Source Review Rule).

4.4 The provisions of this rule shall not apply to stripping of cured coatings, cured adhesives, and cured inks, except the stripping of such materials from spray application equipment.

5.0 Requirements

5.1 On any coating line, a person shall not use or apply any coating with a VOC content in excess of the following limits, expressed as grams of VOC per liter of coating, as applied, excluding water and exempt compounds:

Table 1 Can Coating Lines

	Grams/liter
Sheet basecoat (exterior and interior) and overvarnish	225
Two-piece can exterior basecoat and overvarnish	250
Interior and exterior body spray, interior or exterior end spray or rollcoat	510
Three-piece can side seam spray	660
End Sealing Compound	440

Table 2 Coil Coating Lines

	Grams/liter
Prime and topcoat for single coat operation	200

5.2 The emission limits prescribed above shall be achieved by:

5.2.1 The use of the applicable low VOC coating as specified above; or

5.2.2 Any other emission control process, such as incineration or adsorption, with a minimum of 90 percent overall control efficiency.

5.3 Alternative Emission Control Plan

The requirements of Section 5.1 shall not apply to any coating lines which comply with an alternative emission control plan which satisfies all of the following requirements:

5.3.1 The daily weighted average emissions of VOC, (on an as applied, solids basis), shall be no greater than that amount which would result if the affected coating lines complied with all applicable requirements of Section 5.1.

5.3.2 The control plan shall receive prior written authorization in the form of an Authority to Construct or a Permit to Operate from the APCO.

5.3.3 The person submitting the control plan shall maintain daily records in accordance with Section 6.1.

5.4 Equivalency

The use of coatings with VOC contents in excess of the limits specified in:

5.4.1 Section 5.1, Table 1, shall be allowed, provided the emissions of VOC to the atmosphere is equivalent to the use of coatings which contain:

5.4.1.1 No more than 0.23 grams of VOC per gram of nonvolatile coating material applied in any sheet base coating operation.

5.4.1.2 No more VOC per gram of nonvolatile coating material applied for operations other than sheet base coating than would result from each operation using the complying coatings specified in Section 5.1, Table 1, exclusive of sheet base coating.

5.4.2 Section 5.1, Table 2, shall not apply to a coil coating line from which emissions of VOC to the atmosphere do not exceed 120 grams of VOC per liter of coating as applied, less water and exempt compounds.

5.5 Organic Solvent Cleaning, Storage and Disposal Requirements

5.5.1 Section 5.5 shall be effective on and after November 15, 2002, unless otherwise indicated.

5.5.2 From November 15, 2002, through November 14, 2003, an owner or operator shall not use organic solvents for cleaning operations that exceed the VOC content limits and composite partial pressure limits specified as being “Effective November 15, 2002 through November 14, 2003” in Table 3.

5.5.3 On and after November 15, 2003, an owner or operator shall not use organic solvents for cleaning operations that exceed the VOC content

limits specified as being "Effective November 15, 2003" in Table 3. On and after November 15, 2003, the composite partial pressure of solvents used for cleaning operations will not be regulated.

Table 3 VOC Limits for Organic Solvents Used in Cleaning Operations

Type of Solvent Cleaning Operation	Effective November 15, 2002 through November 14, 2003		Effective November 15, 2003
	VOC Content Limit Grams of VOC/liter of material (lb/gal)	VOC Composite Partial Pressure Limit, mm Hg at 20°C (68°F)	VOC Content Limit Grams of VOC/liter of material (lb/gal)
A. Product Cleaning During Manufacturing Process or Surface Preparation for Coating Application	70 (0.58)	no limit	50 (0.42)
B. Repair and Maintenance Cleaning	50 (0.42)	no limit	50 (0.42)
C. Cleaning of Coating Application Equipment	950 (7.9)	35	550 (4.6)

5.5.4 The provisions of Table 3 shall not apply to the cleaning in laboratory tests and analyses, or bench scale or research and development projects.

5.5.5 The provisions of Sections 5.5.6 through 5.5.8 of this rule shall only apply to an owner or operator that uses any solvent containing more than 50 grams of VOC per liter of material for organic solvent cleaning.

5.5.6 Cleaning activities that use solvents shall be performed by one or more of the following methods:

5.5.6.1 Wipe cleaning; or

5.5.6.2 Application of solvent from hand-held spray bottles from which solvents are dispensed without a propellant-induced force; or

5.5.6.3 Non-atomized solvent flow method in which the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container; or

5.5.6.4 Solvent flushing method in which the cleaning solvent is discharged into a container that is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build-up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping.

5.5.7 Solvent shall not be atomized into the open air unless it is vented to a VOC emission control system that complies with Section 5.2.2. This provision shall not apply to the cleaning of nozzle tips of automated spray equipment systems, except for robotic systems, and cleaning with spray bottles or containers described in Section 5.5.6.2.

5.5.8 An owner or operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless an enclosed system or equipment that is proven to be equally effective at controlling emissions is used for cleaning. If an enclosed system is used, it must totally enclose spray guns, cups, nozzles, bowls, and other parts during washing, rinsing and draining procedures, and it must be used according to the manufacturer's recommendations and must be closed when not in use.

5.5.9 An owner or operator shall store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers or when the container is empty.

5.5.10 In lieu of complying with the requirements in Table 3 – Category C (Cleaning of Coating Application Equipment), an owner or operator may operate a VOC emission collection and control system, with an overall emission capture and control efficiency of at least 90%, that controls the emissions from the source operation.

6.0 Administrative Requirements

6.1 Recordkeeping Requirements for Coatings

Any person who performs a can or coil coating operation subject to Section 5.0 or is exempt by Section 4.1 of this rule shall comply with the following recordkeeping requirements:

6.1.1 The person shall maintain and have available during an inspection, a current list of coatings in use which provides all of the coating data necessary to evaluate compliance including the following information as applicable:

6.1.1.1 specific coatings, catalysts and reducers used.

6.1.1.2 mix ratio of components used.

6.1.1.3 VOC content of each coating, as applied.

6.1.1.4 VOC content of each solvent used for cleanup and surface preparation.

6.1.2 The person shall maintain records including the following information:

6.1.2.1 specific coating used and mix ratio of components added to the coating material prior to application.

6.1.2.2 volume of coatings applied (gallons).

6.1.2.3 specific solvents used.

6.1.2.4 volume of each solvent used for cleanup and surface preparation (gallons).

Stationary sources subject to the requirements of Section 5.0 shall maintain such records on a daily basis.

Stationary sources which are exempt by Section 4.1 may maintain such records on an extended basis, not to exceed monthly, provided the records substantiate coatings used are less than three (3) gallons from the entire extended period.

6.1.3 Such records shall be retained for a minimum of five (5) years and made available for inspection upon request of the APCO.

6.1.4 Excess Reporting: Any record showing violation of Section 5.3.1 shall be reported by sending a copy of such record to the APCO within 96 hours following the occurrence. Such report will include an explanation of the cause of the violation and the corrective action taken.

6.2 Recordkeeping Requirements for Cleaning Solvents

An owner or operator shall comply with the following recordkeeping requirements:

6.2.1 Maintain the records required by Sections 6.2.2 through 6.2.3 for a period of five years. The records shall be made available to the APCO upon request.

6.2.2 Keep a copy of the manufacturer's product data sheet or material safety data sheet of the solvents used for organic solvent cleaning activities.

6.2.3 Maintain a current list of solvents that are being used for organic solvent cleaning activities. The list shall include the following information:

6.2.3.1 The name of the solvent and its manufacturer's name.

6.2.3.2 The VOC content of the solvent expressed in grams/liter or lb/gallon.

6.2.3.3 When the solvent is a mixture of different materials that are blended by the operator, the mix ratio of the batch would be recorded in order to determine compliance with the specified limits of VOC content and/or VOC composite partial pressure, as applied.

6.2.3.4 Through November 14, 2003, the composite partial pressure of the solvent expressed in mm Hg at 20^{o}C (68^{o}F).

6.2.3.5 The type of cleaning activity for each solvent that is being used in accordance with the applicable cleaning category specified in Section 5.5, Table 3 of this rule.

6.3 Recordkeeping for Emission Control Systems

Any person using an emission control system to comply with provisions of this rule through Section 5.2.2 or Section 5.5.10 shall maintain daily records of key system operating parameters which will demonstrate continuous operation and compliance of the emission control system during periods of emission producing activities. Key system operating parameters are those necessary to ensure compliance with VOC limits. The parameters include, but are not limited to, temperatures, pressures, and flowrates. Such records shall be retained for a minimum of five (5) years and made available for inspection upon request of the APCO.

6.4 Compliance Statement Requirements

Manufacturers of any solvents subject to this rule shall indicate on the solvent container, or on a separate product data sheet or material safety data sheet, the name of the solvent, manufacturer's name, the VOC content, density, and VOC composite partial vapor pressure, as defined in the rule, of the solvent, as supplied. The VOC content and VOC composite vapor pressure shall be expressed in units of gm/liter or lb/gallon and mm Hg at 20^{o}C (68^{o}F), respectively.

6.5 Test Methods

6.5.1 Determination of VOC Content

6.5.1.1 The VOC content of solvents and organic materials shall be determined by using United States Environmental Protection

Agency (EPA) Test Method 24 or 24A, or South Coast Air Quality Management District (SCAQMD) Method 304 (Determination of Volatile Organic Compounds in Various Materials), or by using the manufacturer's product formulation data and the formula for "Grams of VOC per liter of Material" in Section 3.0.

6.5.1.2 The content of exempt halogenated VOCs shall be determined by using the California Air Resources Board (ARB) Test Method 432 or SCAQMD Test Method 303 (Determination of Exempt Compounds).

6.5.2 Determination of Control Efficiency of VOC Emission Control Devices

6.5.2.1 The capture efficiency of each collection device shall be demonstrated according to the EPA's document "Guidelines for Determining Capture Efficiency," dated January 9, 1995. An equivalent alternate test method that has been approved by EPA, ARB and the APCO may be used.

6.5.2.2 The emission control system efficiency of any air pollution control equipment shall be determined using EPA Methods 2, 2A, or 2D for measuring flow rates and EPA Methods 25, 25A, or 25B for measuring total gaseous organic concentrations at the inlet and outlet of the control device. EPA Test Method 18 or ARB Method 422 shall be used to determine the emissions of exempt compounds.

6.5.2.3 The overall capture and control efficiency shall be calculated by using the following equation:

$$CE_{CAPTURE\ AND\ CONTROL} = [\ CE_{CAPTURE} \times CE_{CONTROL}\ ] / 100\ \%$$

Where:

$CE_{CAPTURE\ AND\ CONTROL}$ = Overall Capture and Control Efficiency, in percent

$CE_{CAPTURE}$ = Capture Efficiency of the collection device, in percent, as determined in Section 6.5.2.1

$CE_{CONTROL}$ = Control Efficiency of the control device, in percent, as determined in Section 6.5.2.2.

6.5.3 Determination of Vapor Pressure

The composite partial pressure of solvents shall be determined by:

6.5.3.1 determining the identity and quantity of each compound in a blended organic solvent by using ASTM D2306, or SCAQMD Method 308 or by using ASTM E260 for organics and ASTM D3792 for water content, if applicable, or the manufacturer's product formulation data, and

6.5.3.2 by determining the vapor pressure of each pure VOC component by using ASTM D2879 or from publications such as Perry's Chemical Engineer's Handbook, CRC Handbook of Chemistry and Physics, Lange's Handbook of Chemistry, or other District approved sources; and

6.5.3.3 by calculating the composite partial pressure of the solvent by using the formula for "Composite Partial Pressure" in Section 3.0. For the purpose of this calculation, the blended solvent shall be assumed to be an ideal solution where Raoult's Law applies. The partial pressures of each compound at 20º C (68º F) shall be used in the formula.

6.5.4 Determination of Solvent Losses from Spray Gun Cleaning Systems

The passive and active solvent losses from spray gun cleaning systems shall be determined by using SCAQMD "General Test Method for Determining Solvent Losses from Spray Gun Cleaning Systems" dated October 3, 1989. The test solvent for this determination shall be lacquer thinner with a minimum vapor pressure of 105 mm Hg at 20^{o}C. The minimum temperature shall be 15^{o}C.

6.6 Multiple Test Methods

When more than one test method or set of test methods is specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods shall constitute a violation of this rule.

6.7 Version of Test Methods

All ASTM test methods referenced in Section 6.0 are the most recently EPA-approved version that appears in the Code of Federal Regulations as Materials Approved for Incorporation by Reference.

6.8 Operation and Maintenance Plan

Any person subject to the provision of Sections 5.2.2, 5.4.1, or 5.4.2, shall submit to the APCO for approval an Operation and Maintenance (O/M) plan. Such a plan will include operation temperatures, maintenance schedule, cleaning/recharging schedules, dust inspection schedules and any other information assuring continuous compliance with this rule.

This page intentionally blank.